

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 36

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte CHRISTIAN FRANCOIS MICHEL DUJARRIC

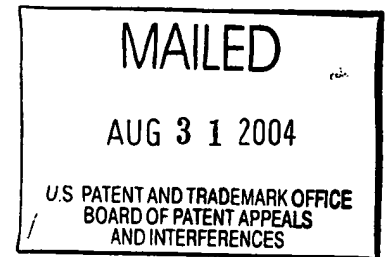
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Appeal No. 2004-1146  
Application 09/492,749

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HEARD: August 19, 2004<sup>1</sup>

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Before COHEN, STAAB, and McQUADE, Administrative Patent Judges.

McQUADE, Administrative Patent Judge.

DECISION ON APPEAL

Christian Francois Michel Dujarric appeals from the final rejection (Paper No. 23) of claims 4 through 8 and 14, all of the claims pending in the application.

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<sup>1</sup> The hearing was attended by the appellant's counsel, Mr. Kimble, and the examiner, Mr. Gartenberg, both of whom presented oral argument.

Appeal No. 2004-1146  
Application 09/492,749

#### THE INVENTION

The invention relates to a propulsion device which is defined in representative claim 14 as follows:

14. A propulsion device comprising; an injection chamber for at least one propellant fluid, said injection chamber disposed upstream from a gas injection nozzle, an inductive coil having at least one loop and surrounding a zone of the injection nozzle to heat the ejected gases by induction, a high frequency electricity generator providing power to said inductive coil with alternating current, said power being transformed into heat in the ejected gas by induction, said heat generating added thrust by gas expansion in a diverging section of said nozzle disposed downstream of said inductive coil.

#### THE REFERENCES

The references relied on by the examiner to support the final rejection are:

Curtis et al. (Curtis)	3,173,248	Mar. 16, 1965
Oberly et al. (Oberly)	4,739,200	Apr. 19, 1998

"Fact Sheet National Space Policy," The White House, National Science and Technology Council, released September 19, 1996.

Appeal No. 2004-1146  
Application 09/492,749

THE REJECTIONS

Claims 4 through 8 and 14 stand rejected under 35 U.S.C. § 101 as being directed to subject matter which is non-statutory because it is against public policy as set forth in the National Space Policy Fact Sheet.

Claims 4 through 8 and 14 stand rejected under 35 U.S.C. § 112, first paragraph, as being based on a specification which is non-enabling.

Claim 14 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Curtis.

Claims 4 and 5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Curtis in view of Oberly.

Claims 6 through 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Curtis in view of Oberly and the appellant's admission that it was known in the art at the time of the invention to use nuclear cores for space propulsion devices.

Appeal No. 2004-1146  
Application 09/492,749

Attention is directed to the main and reply briefs (Paper Nos. 26 and 28) and to the answer (Paper No. 27) for the respective positions of the appellant and examiner regarding the merits of these rejections.

#### DISCUSSION

I. The 35 U.S.C. § 101 rejection of claims 4 through 8 and 14 as being directed to non-statutory subject matter

This rejection rests on the statement in the National Space Policy Fact Sheet that "[s]pace nuclear reactors will not be used in Earth orbit without specific approval by the President or his designee" (page 11). According to the examiner, "[t]here is no indication on the record that such an approval was, or will be granted by the President or his designee to practice the present invention" (answer, pages 3 and 4).

The present invention, however, does not pertain to the use of nuclear reactors in Earth orbit. Indeed, the appealed claims make no mention of space or Earth orbit, and only dependent claims 6 and 7 allude to a nuclear reactor through their

Appeal No. 2004-1146  
Application 09/492,749

recitation of a nuclear core as a heat source. Consequently, the presidential approval policy set forth in the National Space Policy Fact Sheet is not relevant to the subject matter actually recited in the appealed claims. Moreover, even if it were relevant, this approval policy, which is not a blanket prohibition on the use of nuclear reactors in Earth orbit, would not be contravened by the mere patenting of the claimed subject matter.

Thus, the examiner's determination that the subject matter sought to be patented by the appellant is non-statutory is ill founded. Hence, we shall not sustain the standing 35 U.S.C. § 101 rejection of claims 4 through 8 and 14.

II. The 35 U.S.C. § 112, first paragraph, rejection of claims 4 through 8 and 14 as being based on a non-enabling specification

Insofar as the enablement requirement of 35 U.S.C. § 112, first paragraph, is concerned, the dispositive issue is whether the appellant's disclosure, considering the level of ordinary skill in the art as of the date of the application, would have enabled a person of such skill to make and use the claimed

invention without undue experimentation. In re Strahilevitz, 668 F.2d 1229, 1232, 212 USPQ 561, 563-64 (CCPA 1982). In calling into question the enablement of the disclosure, the examiner has the initial burden of advancing acceptable reasoning inconsistent with enablement. Id.

In essence, the examiner's criticism of the appellant's disclosure as being non-enabling rests on concerns as to how one of ordinary skill in the art would make and use the claimed propulsion device for space flight, with the examiner questioning matters such as the weight of the device, the temperatures and pressure ratios at which it operates, etc. The appealed claims, however, do not require the propulsion device recited therein to be for space flight, and generally do not recite the parameters questioned by the examiner. Moreover, the examiner's doubts as to elements which are recited in the claims, such as the nuclear core and heat engine defined in claim 6, rest on unfounded speculation as opposed to a cogent line of reasoning based on facts. As pointed out above, the initial burden is on the examiner to advance acceptable reasoning inconsistent with enablement. Thus, the examiner's contention that the appellant's

Appeal No. 2004-1146  
Application 09/492,749

disclosure is non-enabling is unsound because it is not commensurate with the actual scope of the claims or supported by reasoning which meets the examiner's initial burden to establish a prima facie case of non-enablement.

Accordingly, we shall not sustain the standing 35 U.S.C. § 112, first paragraph, rejections of claims 4 through 8 and 14 as being based on a non-enabling specification.

III. The 35 U.S.C. § 102(b) rejection of claim 14 as being anticipated by Curtis

Anticipation is established only when a single prior art reference discloses, expressly or under principles of inherency, each and every element of a claimed invention. RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984). It is not necessary that the reference teach what the subject application teaches, but only that the claim read on something disclosed in the reference, i.e., that all of the limitations in the claim be found in or

fully met by the reference. Kalman v. Kimberly Clark Corp., 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983), cert. denied, 465 U.S. 1026 (1984).

Curtis discloses a gas ionization and acceleration apparatus which can be used as a propulsion device for a space vehicle (see Figure 2). As shown in Figure 1, the apparatus includes a funnel-shaped electric coil 12, a funnel 18 disposed within the coil 12, a stem 22 leading into the apex of the funnel 18 for supplying an ionizable gas into the funnel, needle points 30 within the funnel 18 near the apex, and a power supply 24 for energizing the coil and needle points.

With regard to the manner in which the foregoing apparatus functions, Curtis teaches that

[i]n operation, the gas is ionized to a preliminary extent by the needle points 30 as the gas is introduced into the funnel. Additional ionization occurs as a result of the high frequency supplied to the coil 12. . . . The ionization becomes cumulative as a result of the interaction of the electric and magnetic fields provided by the flaring or funnel-shaped coil 12.



The nature of the electric and magnetic field within the funnel plays an important part in the gas ionization and in the plasma acceleration operation of the funnel apparatus. More specifically, the magnetic field in the center of the funnel is generally axial, while the electric field is circular and provides electric field patterns coaxial with the funnel. Thus, the initial electrons generated within the funnel are accelerated by the electric field toward a circular trajectory; the axial magnetic field, however, imparts inward and outward components of motion to the electrons, as the direction of the magnetic field reverses.

These inward and outward radial forces on the rotating electrons are a result of the "motor" forces of a magnetic field on a "current" flowing perpendicular to the field. In the present case, of course, the "current" is the electron stream. . . .

The flaring configuration of the coil provides an inner zone near the apex of the coil where the magnetic field diverges gradually and is of high density, and an outer region near the mouth of the funnel where the field diverges rapidly. The high density region permits relatively complete ionization, while the highly divergent field accelerates the plasma from the mouth of the coil [column 2, line 36, through column 3, line 7].

Also of note is Curtis' description of thermal effects on the gas:

[i]n accordance with a suggested theory of operation, the gas is believed to be ionized cumulatively by the expanding and contracting cloud of electrons formed near the apex of the funnel . . . . The flaring nature of the funnel produces an outward component of velocity to the gas plasma formed within the coil. This predominant effect is supplemented by thermal effects, and causes

the forceable ejection of the plasma and the gas which is not ionized from the flared end of the funnel [column 1, lines 43 through 53].

In finding that the subject matter recited in claim 14 is anticipated by Curtis (see page 9 in the answer), the examiner (1) reads the limitations in the claim relating to the injection chamber, gas injection nozzle, inductive coil and high frequency generator on Curtis' stem 22, funnel 18, coil 12, and power supply 24, respectively, and (2) finds that energizing the coil 12 by the power supply 24 inherently heats by induction the propellant fluid introduced into the funnel 18 through the stem 22.

The appellant counters that anticipation does not lie (see pages 19 through 21 in the main brief and pages 6 and 7 in the reply brief) because Curtis generates thrust through Lorentz forces (so-called magnetohydrodynamic propulsion) rather than thermal expansion, and thus does not contemplate thrust from induction heating by the coil or a nozzle downstream of the coil.

Given the rather broad scope of claim 14, this line of argument is not persuasive.

To begin with, claim 14 does not contain any limitation which excludes, or is otherwise inconsistent with, the use by Curtis of Lorentz forces to generate thrust. In addition, the examiner's finding that Curtis' coil 12 will heat the propellant fluid by induction is reasonable on its face and finds convincing support in the description by Curtis of the thermal effects of the coil on the propellant fluid which contribute to the forceable ejection of the fluid from the flared end of the funnel. Finally, claim 14 requires a diverging section of a nozzle disposed downstream of the coil, not a nozzle disposed downstream of the coil. The appellant does not dispute that Curtis' funnel 18 constitutes a nozzle, and as clearly shown in Figure 1, this funnel does include a diverging section disposed downstream of the coil 12.

Thus, to the extent argued by the appellant, the subject matter recited in claim 14 does not distinguish over that disclosed by Curtis. We shall therefore sustain the standing

Appeal No. 2004-1146  
Application 09/492,749

35 U.S.C. § 102(b) rejection of claim 14 as being anticipated by Curtis.

IV. The 35 U.S.C. § 103(a) rejection of claims 4 and 5 as being unpatentable over Curtis in view of Oberly

Claim 4 depends from claim 14 and requires at least one of the propellant fluids to feed at least a first heat exchanger for cooling the electricity generator. Claim 5 depends from claim 14 and requires the injection chamber to have a first inlet for a first propellant fluid and a second inlet for a second propellant fluid which enters into the injection chamber and reacts chemically to produce heat. The examiner's reliance on Oberly to cure Curtis' failure to respond to these limitations is not well taken.

Oberly discloses a generator system (see Figure 8) which is fairly summarized by the following passage:

hydrogen fuel, in its liquid state, would be stored in cryostats 40. Upon the system startup, the liquid hydrogen at 21° K. would be pumped from the cryostats through a line 42, circulated through the generator rotor 28 (perhaps including a stator 26) and then via a

Appeal No. 2004-1146  
Application 09/492,749

line 44 into the hydrogen combustor 46. The hot gases generated in the combustor would power the turbine assembly 50 that would be turning the generator. If this system were to be used on aerospace platform, liquid oxygen from LOX storage tank 52 flowing through a line 54 would be combined in the combustor to sustain the combustion of the liquid hydrogen fuel [column 8, lines 51 through 62].

As is manifestly apparent, the Oberly system differs markedly from that disclosed by Curtis in terms of both structure and function. The only suggestion for combining the disparate teachings of these two references so as to arrive at the subject matter recited in claims 4 and 5 stems from hindsight knowledge impermissibly derived from the appellant's disclosure.

Consequently, we shall not sustain the standing 35 U.S.C. § 103(a) rejection of claims 4 and 5 as being unpatentable over Curtis in view of Oberly.

Appeal No. 2004-1146  
Application 09/492,749

V. The 35 U.S.C. § 103(a) rejection of claims 6 through 8 as being unpatentable over Curtis in view of Oberly and the appellant's admission that it was known in the art at the time of the invention to use nuclear cores for space propulsion devices

As the appellant's admission fails to cure the above noted deficiencies of Curtis and Oberly relative to the subject matter recited in parent claim 5, we shall not sustain the standing 35 U.S.C. § 103(a) rejection of dependent claims 6 through 8 as being unpatentable over Curtis in view of Oberly and the admission.

#### SUMMARY

The decision of the examiner:

a) to reject claims 4 through 8 and 14 under 35 U.S.C. § 101 is reversed;


b) to reject claims 4 through 8 and 14 under 35 U.S.C. § 112, first paragraph, is reversed;

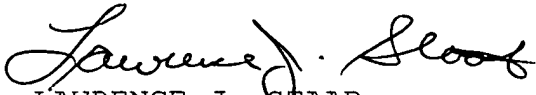
c) to reject claim 14 under 35 U.S.C. § 102(b) is affirmed;  
and


Appeal No. 2004-1146  
Application 09/492,749

d) to reject claims 4 through 8 under 35 U.S.C. § 103(a) is reversed.

AFFIRMED-IN-PART

  
IRWIN CHARLES COHEN  
Administrative Patent Judge

  
LAWRENCE J. STAAB  
Administrative Patent Judge

  
JOHN P. McQUADE  
Administrative Patent Judge

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Appeal No. 2004-1146  
Application 09/492,749

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